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Title in German of the object of the invention:  
Sandwichplatten

## SANDWICH PANELS

## Description

The invention pertains to sandwich panels [\*Translator's note:  
Also known as laminated panels] of a polypropylene-foamed core layer  
and cover layers of glass-fiber matting reinforced polypropylene\*  
[\*Translator's note: Also known as PP, and Propathene7 (i.e. the polypropylene  
homo- and copolymers)].

For many a great number of applications, there is a requirement to light structural elements, which - besides a low weight and a low price - should have a very adequate strength and stiffness (rigidity), and, moreover, be easily recyclable.

These requirements are met by the sandwich panels in accordance with the invention. These sandwich panels consist of:

A - A core layer of polypropylene particle foam, having a density of 0.02 to 0.10 g.cm<sup>3</sup> [sic!!!] [\*Translator's note: Presumably, and, most probably, the inventors have in mind, 0.02 to 0.10 g/cm<sup>3</sup> rather than 0.02 to 0.10 g.cm<sup>3</sup> but have not been able to express this explicitly, and have left it to the imagination of the readers.]

B - Two cover layers of glass-fiber matting reinforced polypropylene, having a fiber content of 20 to 60 % by weight.

The core layer A consists of a particle foamed material [\*Translator's note: Also known as expanded (foamed; aerated cellular) plastic; cellular polymer; plastic foam] on the basis of a homopolymers or copolymers of the polypropylene. Preferably, propylene copolymers are used, having a melting point between 125 and 155°C, preferably between 130 and 150°C. In doing so, the maximum value, defined in accordance with the DSC-method\* [\*Translator's note: The inventors have not specified what the abbreviation or acronym DSC mean. It could mean either a) thin-layer chromatography; or b) differential scanning calorimetry, which is used in thermoanalysis.] over the course of the second melting of a sample (crystallite melting point), holds true in its capacity as melting point. Copolymers

of the propylene, having 1 to 30 % by weight, in particular 1 to 6 % by weight of ethylene, and/or of a C<sub>4</sub>-to C<sub>6</sub> -  $\alpha$ -olefin, are especially suitable in an efficient way.

The foamed material is a so-called particle foamed material, as it can be obtained by hot sealing [thermal sealing] of foamed-material particles, customarily having a mean diameter of 2 to 8 mm, preferably 3 to 6 mm. The density of the foamed material is between 0.03 and 0.08 g/cm<sup>3</sup>.

Preferably, the thickness of the core layer constitutes 5 to 100, in particular 5 to 40 mm.

The cover(ing) layers B consist of glass-fiber matting reinforced polypropylene. This contains 20 to 60, preferably 30 to 45 % by weight of glass fibers, preferably in the form of mats [mattings]. The mattings bring about the high strength of the material. The length of the glass fibers can vary in wide ranges, between approximately 2 mm and infinity. Preferred are mats, which consist of cut [sic] glass-fiber rovings\*, having a length of 5 to 25 mm, [\*Translator's note:

The word rovings implies glass-fiber rovings. However, roving implies untwisted glass fiber, which is already c u t. Also known as rowing, i.e. untwisted thread/strand between sliver and strand], and which were needle-punched. Over the course of the needle-punching, several glass-fibers were shattered, or broken to pieces, so that the needle-punched mat also has contents of shorter fibers.

Preferably, the gram weight [basis weight] of the glass-

fiber mats constitutes 200 to 1,200 g/m<sup>2</sup>. The cover layers are preferably having a thickness of 1 to 10, in particular 2 to 5 mm.

The manufacturing of the sandwich panels in accordance with the invention takes functionally place as a result of the compaction or molding of cover layers, which have been preheated to a temperature range of about 210 °C, with the core layer. Basically, however, the layers can also be glued to one another.

For example, the laminated composites\* [\*Translator's note: Also known as laminated sheet materials] can also be used as sound-insulating materials in the construction industry, or as automobile parts, e.g., loading (cargo) floors or bottoms, heat-insulating elements, or sound-absorbing structural components.

### Patent Claims

1. Sandwich panels (plates), consisting of

A - A core layer of polypropylene particle foam, having a density of 0.02 to 0.10 g.cm<sup>3</sup> [sic !!!]

B - Two cover layers of glass-fiber matting reinforced polypropylene, having a fiber content of 20 to 60 % by weight.

2. Sandwich panels (plates) as claimed in claim 1, characterized in that the core layer A has a thickness from 5 to 100 mm, and the cover layer has a thickness of 1 to 10 mm.

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